Built to Digest

How organ structures shape the path of a meal

HAP.13.1 "Analyze the structure-function relationship in organs of the digestive system."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one physical feature in each of the mouth, stomach, small intestine, and large intestine. Circle the job each feature supports, then give each feature and its matching job the same number.

A Burrito's Journey

1. A bite of a bean burrito begins a trip through organs built for different jobs. In the mouth, broad molars crush the tortilla and beans into smaller pieces, exposing more food to digestive chemicals. Salivary glands release fluid that moistens the pieces, while an enzyme in saliva begins breaking starch into smaller sugars. The tongue moves the softened food into a ball that can be swallowed. This first stage matters even though few nutrients enter the blood here. Smaller, wetter pieces are easier for later organs to move and for enzymes to reach.

2. In the stomach, thick layers of muscle squeeze and turn the food, mixing it with acid and a protein-digesting enzyme released by glands in the stomach wall. Acid helps the enzyme work and kills many microbes. The stomach's mucus-coated lining protects its own cells from acid and enzymes. After several hours, the mixture passes into the small intestine. Its long, folded inner surface is covered with tiny fingerlike villi. This shape creates a large area where digested nutrients can cross the lining. Blood vessels inside the villi carry many absorbed nutrients away, making room for more to enter.

3. The small intestine does not work alone. The pancreas sends digestive enzymes into it, including ones that help break down fats, proteins, and starch. The liver makes bile, which reaches the intestine through ducts and separates large fat droplets into smaller droplets that enzymes can act on. What remains then enters the large intestine. Its muscular walls move the leftovers slowly past a lining that absorbs water and salts. Unlike the small intestine, it has no villi for absorbing most nutrients. As water leaves, the leftovers become firmer waste that can be stored in the rectum before leaving the body.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do the shape of the molars and the fluid from salivary glands prepare a bite for later digestive organs?

2. Why does the stomach need both thick muscle layers and a mucus-coated lining?

3. Why would a smooth small-intestine lining absorb fewer nutrients than the folded lining with villi described in the passage?

4. How do the large intestine's slow-moving muscular walls and lining help turn leftovers into firmer waste?

3 YOUR TURN

Your own words

Invent a two-chamber digestive organ for an animal that eats large, protein-rich meals. Describe one structural feature in each chamber, based on two different human organs in the passage, and explain how each feature helps digest food or absorb nutrients.

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PART 1 · READ AND MARK

Underline one physical feature in each of the mouth, stomach, small intestine, and large intestine. Circle the job each feature supports, then give each feature and its matching job the same number. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do the shape of the molars and the fluid from salivary glands prepare a bite for later digestive organs?	**Broad molars crush food into smaller pieces, exposing more of it to digestive chemicals. Saliva moistens the pieces so they are easier to swallow and move.**
2	Why does the stomach need both thick muscle layers and a mucus-coated lining?	**The muscles squeeze food and mix it with acid and a protein-digesting enzyme. Mucus protects the stomach's cells from the acid and enzymes.**
3	Why would a smooth small-intestine lining absorb fewer nutrients than the folded lining with villi described in the passage?	**Folds and villi create more surface area for digested nutrients to cross into the body.**
4	How do the large intestine's slow-moving muscular walls and lining help turn leftovers into firmer waste?	**The walls move leftovers slowly past the lining, which absorbs water and salts. Removing water makes the waste firmer.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

My animal's first chamber has thick muscular walls like a stomach. They churn its large meal with protein-digesting juices so enzymes can reach more of the food. Its second chamber has a folded lining covered in villi like a small intestine. The extra surface lets more digested nutrients cross the lining and enter blood vessels.

Accept accurate feature-function links supported by the passage. For Your Turn, each chamber should have a distinct feature modeled on a different human organ, with a plausible explanation of its job.